

### **REMARKS**

Claims 1-30, 56-61 and 74-79 are pending in the present application. Claims 1, 13, 23, 56, 58, 60, and 77-79 have been amended. Support for these amendments may be found, for example, in Figure 4A and related discussion in the specification of the Patent Application. No new matter has been added. Applicants have submitted a Request for Continued Examination with the present paper and therefore request that the Examiner enter and consider the amendments indicated herein.

In the Office Action, claims 1-30 and 74-79 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicants respectfully traverse the § 112 rejections.

Figures 4A-4C of the present application show the back gate electrode 13 extending under source and drain regions 18 of a semiconductor device 10. Applicants therefore respectfully submit that, pursuant to the amendments indicated herein, claims 1-30 and 74-79 are fully supported by the written description. Applicants respectfully submit that the § 112 rejections should be withdrawn.

In the Office Action, claims 1-30, 56-61 and 74-79 were rejected under 35 U.S.C. § 103 as allegedly being obvious over Inoue (U.S. Patent No. 6,096,582) in view of En (U.S. Patent No. 6,611,023). Applicants respectfully traverse the Examiner's rejections.

A finding of obviousness under 35 U.S.C. § 103 requires a determination of the scope and content of the prior art, the level of ordinary skill in the art, the differences between the claimed subject matter and the prior art, and whether the differences are such that the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made. *Graham v. John Deere Co.*, 148 USPQ 459 (U.S. S.Ct. 1966). To

determine whether the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made, one should determine whether the prior art reference (or references when combined) teach or suggest all the claim limitations. Furthermore, it is necessary for the Examiner to identify the reason why a person of ordinary skill in the art would have combined the prior art references in the manner set forth in the claims. Teaching away by the prior art may constitute *prima facie* evidence that the claimed invention is not obvious.

Claims 1, 13, 23, and 77-79 include, among other things, the limitations that the doped back gate region extends under a source region of the semiconductor device and a drain region of the semiconductor device. Applicants respectfully submit that the cited references fail to teach or suggest this limitation in the claims. Moreover, Applicants respectfully submit that En teaches away from forming a doped back gate region that extends under a source region and a drain region of a semiconductor device such as a transistor.

En describes forming a back gate 38 by performing an implant process through the area occupied by a disposable gate 86. En teaches that the polysilicon gate 34 and the polysilicon back gate 38 must be precisely aligned to avoid degradation of performance due to overlap capacitance caused by gate misalignment. See En, col. 4, ll. 39-51 and Figure 1. Consequently, the back gate 38 in En is a strip that extends along the width of the channel and exactly mirrors the polysilicon gate 34, *i.e.*, the polysilicon back gate 38 extends into the drawing in Figure 3j. See En, col. 6, l. 56 – Col. 7, l. 3. It is also clear from the manner in which the device in En is made that the back gate 38 does not extend laterally, *i.e.*, in the gate length direction, beyond this strip. That is, the back gate 38 in En does not extend under the source/drain regions 16, 18 shown in En. See En, Figure 3h-3j.

Thus, Applicants respectfully submit that En does not describe or suggest a doped back gate region that extends under a source region of the semiconductor device and a drain region of the semiconductor device. To the contrary, En teaches away from this claim limitation. In particular, En teaches that the polysilicon gate 34 and the polysilicon back gate 38 must be precisely aligned to avoid degradation of performance due to overlap capacitance caused by gate misalignment. See En, col. 4, ll. 39-51 and Figure 1. En therefore teaches away from extending the polysilicon back gate 38 beyond the boundaries defined by the polysilicon gate 34 because En teaches that this would lead to degradation of performance due to overlap capacitance caused by gate misalignment.

For at least the aforementioned reasons, Applicants respectfully submit that claims 1, 13, 23, 77-79, and all claims depending therefrom would not have been obvious over the prior art of record. Applicants therefore respectfully request that the Examiner's rejections of claims 1-30 and 74-79 under 35 U.S.C. § 103(a) be withdrawn.

Independent claims 56, 58 and 60 recite, among other things, that the doped back gate region as defined in these claims is a doped region that is doped with a dopant material that is of the same dopant type as the dopant material employed in a channel region formed in the active layer. For example, if the active layer is doped with a P-type dopant material, *e.g.*, boron, the doped back gate region is also a doped region that is doped with the same type – P-type – dopant material. However, different dopant species – of the same dopant type – may be employed in the active layer and the doped back gate region.

Applicants respectfully submit that independent claims 56, 58 and 60, and all claims depending therefrom, are in condition for allowance. In En, the back gate 38 is doped with a dopant material that is of an opposite type to that of the active layer. En specifically notes that

the channel region 14 is doped with P-type dopant material (Col. 4, ll. 29-32) while the back gate region 38 is formed by implanting an N-type dopant material (Col. 6, ll. 56-61). That is, En teaches exactly the opposite of the subject matter now set forth in amended independent claims 56, 58 and 60. Moreover, there does not appear to be any motivation or suggestion in the art of record that would lead one skilled in the art to modify the express teachings of En so as to arrive at the presently claimed inventions. If anything, En can be thought of as teaching away from the inventions defined in independent claims 56, 58 and 60.

For at least the aforementioned reasons, Applicants respectfully submit that independent claims 56, 58 and 60 (as amended herein) would not have been obvious over the prior art of record. Applicants therefore respectfully request that the Examiner's rejections of claims 56-61 and 77-79 under 35 U.S.C. § 103(a) be withdrawn.

For the aforementioned reasons, it is respectfully submitted that all claims pending in the present application are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4052 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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